UNITED STATES PATENT AND TRADEMARK OFFICE

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09/804,069	03/12/2001	Chi-Ying Tsui	. 4522/9	9093

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EXAMINER
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ART UNIT	PAPER NUMBER
2837	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _23 July 2007_.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-62_ is/are pending in the application.

    4a) Of the above claim(s) _38-62_ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-37_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _31 August 2004_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

Election/Restrictions

0.   Applicant's election without traverse of claims 1-37 in the reply filed on 5 July

2007 is acknowledged.

Claim Rejections - 35 USC § 112

1.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly
> claiming the subject matter which the applicant regards as his invention.

2.   The term "relatively large" in claims 2, 14, 16, 23, 27, 32, & 37 is a relative term

which renders the claim indefinite. The term "relatively large" is not defined by the

claim, the specification does not provide a standard for ascertaining the requisite

degree, and one of ordinary skill in the art would not be reasonably apprised of the

scope of the invention. It is unclear how large the SED indicator must be in order for it

to be considered to be "relatively large."

3.   Claims 1-31 & 37 are rejected under 35 U.S.C. 112, second paragraph, as being

indefinite for failing to particularly point out and distinctly claim the subject matter which

applicant regards as the invention. Claims are directed to "converting a digitized melody

into a sequence of notes," but it is not clear where in the claims the melody is actually

converted into a sequence of notes.

Claim Rejections - 35 USC § 101

4.   35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5.   Claims 1-21 & 27-37 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The claims do not present a tangible result. Melodies are segmented, energy distributions are calculated, breakpoints are estimated, etc., but no tangible result, such as outputting the notes, displaying the notes on a screen, or playing a song associated with the selected notes, is presented.

Claim Rejections - 35 USC § 102

6.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7.   Claims 1-2, 13, 15, & 21-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Tsuruta et al. (U.S. Patent No. 5,038,658, hereafter '658).

Claims 1 & 22:   '658 teaches a method for converting a digitized melody into a sequence of notes, comprising: segmenting said melody into a series of frames (16); computing a spectral energy distribution (SED) indicator for each frame; and estimating

initial breakpoints in said melody based on said SED indicator, said notes being defined

between adjacent initial breakpoints (cols. 9-17).

Claims 2 & 23:   '658 teaches the method according to claim 1, wherein said

SED indicator has a value, the value for a given frame that is relatively large if an

energy distribution associated with said frame is concentrated in at least one specified

frequency band (cols. 9-17).

Claims 13 & 15:   '658 teaches the method according to claim 1, including

estimating the pitch of each frame (cols. 17-19).

Claim 21:   '658 teaches the method according to claim 1, wherein the melody

is a voice-hummed melody composed of a series of uttered semi-vowels (see abstract).

Claim Rejections - 35 USC § 103

8.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9.   This application currently names joint inventors. In considering patentability of

the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

the various claims was commonly owned at the time any inventions covered therein

were made absent any evidence to the contrary. Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g)

prior art under 35 U.S.C. 103(a).

10.   Claims 3, 5, 24, & 26 are rejected under 35 U.S.C. 103(a) as being unpatentable

over '658, as applied to claims 2 & 23 above, in view of Iijima et al. (U.S. Patent No.

6,243,672, hereafter '672).

    Claims 3 & 24:   '658 teaches the method and apparatus of claims 2 & 23, but

does not explicitly teach filtering said melody with a high pass filter prior to segmenting

said melody into frames. '672 teaches that a high-pass filter can be used to remove

signals of an unneeded range (col. 4, lines 45-48). It would have been obvious to one of

ordinary skill in the art at the time the invention was made to have used a high-pass

filter with the invention of '658 in order to have filtered out unneeded frequencies.

    Claims 5 & 26:   '658 computes the power of the frames (col. 9-17). If the

signal being analyzed happens to have power concentrated in the upper end of the 0 to

4 kHz range, the device of '658 will detect it as such.

11.   Claims 4 & 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over

'658 and '672, as applied to claims 3 & 24 above, and further in view of Moshier (U.S.

Patent No. 4,038,503, hereafter '503). '658, as combined with '672, teaches the method

and apparatus of claims 3 & 24, but does not explicitly teach determining said energy

distribution from a normalized energy spectrum of said frame. '503 teaches that

normalizing the spectrum results in the emphasis of shifts in individual formant

frequencies from one short-term power spectra to another (col. 7, lines 34-41). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have normalized the spectrum of '658 in order to have emphasized shifts in individual formant frequencies from one short-term power spectra to another in order to have aided in segmentation based on power information (col. 9-17) of '658.

12.   Claims 14, 16, 27-28, 30-33, & 35-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over '658 as applied to claims 13 & 15 above, in view of Taguchi (U.S. Patent No. 4,282,405, hereafter '405).

Claim 14:   '658 teaches the method according to claim 13, wherein estimating said pitch of each frame comprises: computing the auto-correlation of each frame (see paragraph bridging cols. 1 & 2); but does not explicitly teach that estimating the pitch of each frame by selecting a pitch period corresponding to a shift where an auto-correlation coefficient associated with said frame is relatively large. '405 teaches that it is usual to estimate pitch by selecting a pitch period corresponding to a maximum in autocorrelation coefficients (col. 2, lines 18-29). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have estimated pitch in this way in '658, since it is recognized in '405 as being the usual method of doing so.

Claim 16:   '658 teaches the method according to claim 15, wherein estimating said pitch of each note between said initial breakpoints comprises: computing auto-correlation of each frame (see paragraph bridging cols. 1 & 2); and averaging or taking the median of the pitch estimates of said frames between said adjacent breakpoints

(col. 23, lines 24-28); but does not explicitly teach estimating the pitch of each frame by selecting a pitch period corresponding to a shift where an auto-correlation coefficient associated with said frame is relatively large. For estimating pitch using auto-correlation coefficients, see claim 14.

Claims 27, 32, & 37:   '658 teaches a method for converting a digitized melody into a sequence of notes, comprising: segmenting said melody into a series of frames (16); computing auto-correlation of each frame (see paragraph bridging cols. 1 & 2); estimating pitch of each frame based on (ii) closeness of pitch estimate to estimates in at least one adjacent frame (cols. 17-19); and estimating breakpoints in said melody based on changes in said pitch estimates, said notes being defined between adjacent breakpoints (cols. 21-32). '658 does not explicitly teach estimating the pitch based on (i) a pitch period corresponding to a shift where an auto-correlation coefficient associated with said frame is relatively large. For estimating pitch using auto-correlation coefficients, see claim 14.

Claim 32:   '658 also teaches determining regions of said melody where pitch estimates are likely to be invalid; and identifying said breakpoints in said melody based on transitions between frames having valid pitch estimates and transitions having invalid pitch estimates (cols. 17-19).

Claim 37:   '658 also teaches a means for estimating breakpoints in said melody based on changes in said pitch estimates or transitions between frames having valid pitch estimates and frames having no pitch estimates, said notes being defined between adjacent breakpoints (cols. 17-19).

Claim 28:   '658 teaches the method according to claim 27, including

estimating said breakpoints based on rate of change of said pitch estimates (col. 17-19).

Claims 30 & 35:   '658 teaches the method according to claim 27, including

estimating said pitch of each note by selecting average or median pitch of said frames

falling within a pair of said breakpoints (col. 23, lines 24-28).

Claims 31 & 36:   '658 teaches the method according to claim 27, wherein said

melody is a voice-hummed melody (see abstract).

Claim 33:   '658 teaches the method according to claim 32, including

estimating said breakpoints based on rate of change of said pitch estimates (cols. 17-
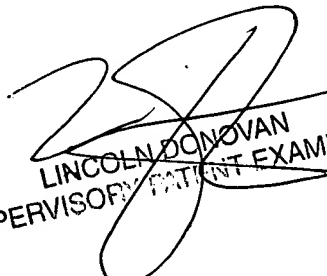
19).

13.   Claims 29 & 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over

'658, '405, & '672, as applied to claims 27, 32, 3, & 24 above, and further in view of

Takashima et al. (U.S. Patent No. 4,633,748, hereafter '748). '658 and '405 teach the

methods of claims 27 & 32, but do not explicitly teach the use of a band pass filter prior

to segmenting said melody into frames. '748 teaches that band-pass filters can be used

in place of other filters (see paragraph bridging cols. 5 & 6). Thus, for the same reason

as given in the rejection of claims 3 & 24 above, it would have been obvious to one of

ordinary skill in the art at the time the invention was made to have used a band-pass

filter with the invention of '658 in order to have filtered out unneeded frequencies.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Millikin whose telephone number is 571-270-1265. The examiner can normally be reached on M-R 7:30-5 and 7:30-4 Alternating Fridays (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lincoln Donovan can be reached on 571-272-1988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LINCOLN DONOVAN
SUPERVISORY PATENT EXAMINER